

## A new station for Hemlock in Minnesota

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A new location for eastern hemlock (*Tsuga canadensis* (L.) Carr.) in Minnesota, probably representing the westernmost occurrence of this species in North America, was recently called to the writers' attention by officers<sup>1</sup> of the Division of Forestry of the State Conservation Department. The fourth station for this species definitely known to exist within the State at the present time, it consists of a group of three trees (Figures 1 and 2) about 400 feet south of State Highway Number 27 (from which they are plainly visible) in the northeast  $\frac{1}{4}$  of the northeast  $\frac{1}{4}$  of Section 14, Township 43 North, Range 25 West, Mille Lacs County.

The area was visited by the authors in early November, 1935 and the measurements taken which appear in the accompanying table. Total height was obtained by means of an Abney

TABLE 1

Tree No.	Diameter Breast High* Inches	Age at Breast Height* Years	Total Height Feet	Crown Class	Remarks
1	20.2	100 to rot, 4 inches from center	73	Dominant	Last 9 feet of top dead; general condition good
2	8.1	110	38	Suppressed by 1 and 3	Good
3	13.9	106 to rot; total probably about 160	53	Codominant	Fair; some dead branches, possibly the result of exposure
4	6 ±	—	27 ±	—	Dead stub about 6 feet high; top on ground

\*  $4\frac{1}{2}$  feet above the ground.

<sup>1</sup> The trees were discovered by Ranger P. W. Swedberg of Moose Lake, Minnesota.



Fig. 1. Distant view of hemlock trees located near Mille Lacs, Minnesota.

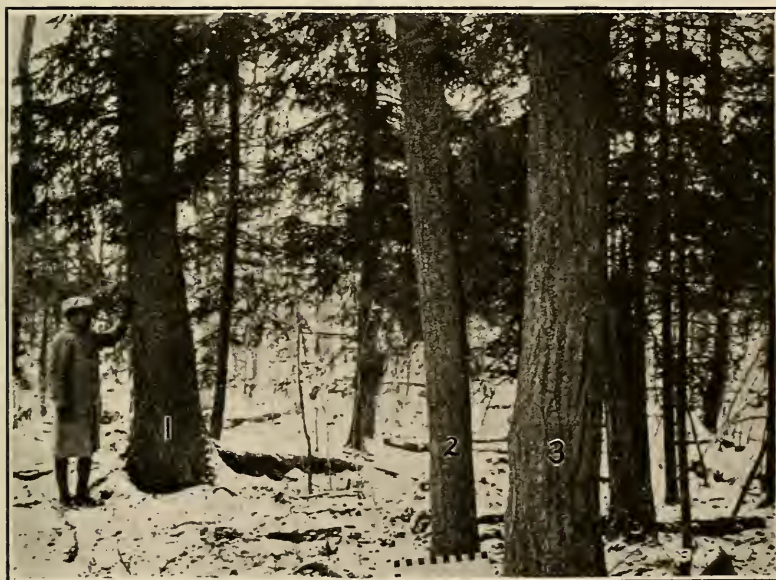


Fig. 2. Close-up of trees shown in Figure 1. Numbers refer to tree numbers of Table 1.

level and 100-foot tape and diameter measured by a diameter tape. Age was determined as accurately as possible from increment borings.

The trees are located near the foot of a slight slope rising from a poorly-drained area. Although the soil is shown as peat in the soil map of Mille Lacs County,<sup>2</sup> a closer examination showed it to consist of a somewhat sandy, clay loam, becoming heavier in texture with depth. Orange and brick-red mottlings at about two feet gave evidence of a fluctuating water table which at that time was found at 33 inches. A thin layer of leached, gray soil (A<sub>2</sub>) was noted in one place where the soil was disturbed, but none was present in the profile taken.

The surrounding forest is composed of an all-aged stand which is transitional between the white spruce-balsam fir-paper birch type, the climax forest of northern Minnesota, and the sugar maple-basswood type, the climax association of the southern part of the State. In order of their observed importance the trees present are balsam fir, yellow birch, black ash, white pine, and white spruce. Some sugar maple and paper birch also occur in small numbers, but basswood appears to be absent in the immediate neighborhood of the hemlock. From the composition it is evident that the stand, although transitional between the two climax associations, tends more toward the white spruce-balsam fir-paper birch type than toward the deciduous climax.

Since the area has been cut over at various times in recent years for spruce and paper birch (birch stumps 16 to 18 inches in diameter were seen), the stand is generally irregular and open. In the proximity of the hemlock group, it is somewhat denser, however. At present the area is also used for pasture.

Because of the cutting and the grazing, the future of these trees and this botanical station is not very promising. Reproduction of hemlock and also of other species, probably because of the grazing, was practically absent at least from the vicinity of the old trees. Although only about a dozen one- or two-inch hemlock seedlings were found, chiefly on an old, badly-decayed stump of this species, others may possibly have been concealed

<sup>2</sup> Bodman, G. B., et al, 1932, Soil Survey of Mille Lacs County, Minnesota. U. S. Department of Agr. Bur. Chem. and Soils Series 1927, No. 37, 46 p., illus, map.

by the light cover of snow present at the time the observations were made.

The snow also made it impossible to obtain a complete list of all the species of vegetation in the proximity of the hemlock group. However, the following species, some of which were probably introduced along with the livestock, were noted: *Dryopteris intermedia*, *Carex* spp., *Maianthemum canadense*, *Polygonum* sp., *Coptis trifolia*, *Mitella nuda*, *Ribes Cynosbati*, *Fragaria* sp., *Rubus idaeus* var. *aculeatissimus*, *Trifolium repens*, *Cornus canadensis*, *Verbascum Thapsus*, and *Lonicera canadensis*.

Specimens collected from the trees may be found in the U. S. National Herbarium at Washington and in the herbarium of the University of Minnesota.

At the present time the only hemlocks definitely known to exist in Minnesota are: the Mille Lacs trees; two trees which have been known for a few years in Jay Cooke State Park near Duluth; a lone tree in Township 41 North, Range 17 West, Pine County; and a few along the St. Croix River north of Taylor's Falls. In earlier days, according to Winchell,<sup>3</sup> the species was known to occur in small groups or stands at several locations in the east-central part of the State, namely, in the vicinity of Brookston and Paupores in St. Louis County (this included a stand of about 300 acres), near Askov in Pine County, near Moose Lake and in the neighborhood of Howell, both in Carlton County. Although the State Division of Forestry has made an exhaustive search for these trees in recent years, all traces of them, with the possible exception of those near Howell which are likely the same as the present Jay Cooke Park trees, have been obliterated, probably by the severe fires of 1918 or earlier years.

No previous record, however, is known to exist of the Mille Lacs trees. Since these are about thirty miles farther to the west than the westernmost of the stations reported by Winchell (the Moose Lake trees), it is readily apparent that this location represents a considerable extension in range for this species. Rumors have been heard of hemlocks even farther west than

<sup>3</sup> Winchell, N. H. 1896. Geology of Carlton County. *In* Final Report Minn. Geol. and Natural History Survey 4:6.

the Mille Lacs station, but it seems doubtful if these are authentic. On the other hand, it is believed careful study will reveal others in the eastern part of the State, particularly in the St. Croix Valley.

To prevent the species from being completely lost to the State, the Division of Forestry is keeping close watch over both stations and is collecting seed every time there is a crop. Some 2000 seedlings from seed thus collected are now being grown in the State Nursery at Badoura. Although just what disposition will be made of these seedlings is not known, it is believed they will be used to restock some of the areas where the species occurred in former days.

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